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(54) Perfected machine with continuous operating cycle for the packaging in rolls of various strap-shaped materials by means of a plurality of simultaneous longitudinal cuts of a wide strip of material fed by a roller.

(57) The object of this invention is a perfected machine, which, with continuous operating cycle, is suitable for the packaging in rolls of various strap-shaped materials by means of plurality of longitudinal cuts of a wide strip of material fed by a roller.

The machine in question comprises at least one pair of spindles (20) supporting a plurality of cores (44) on which the above-mentioned strap-shaped materials, obtained by cutting a wide strip of material fed by a roller (12), will be wound.

Once the rolls of material have been filled with the required quantity, the spindles are carried to a discharge station or unit (28), which cooperates with a supporting shaft on which the abovementioned discharge units carry the terminated rolls (22). The machine also comprises at least one pair of shafts to prearrange a new plurality of cores on the spindles for the start of a new packaging cycle.

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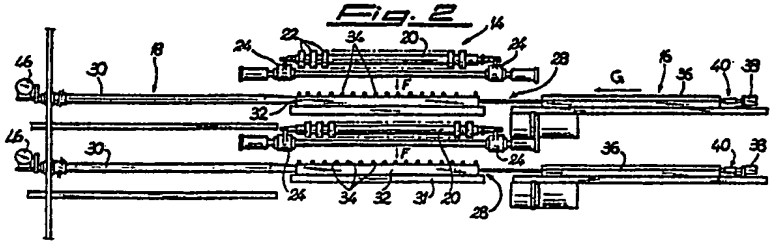
Fig. 2



PERFECTED MACHINE WITH CONTINUOUS OPERATING CYCLE FOR THE PACKAGING IN ROLLS OF VARIOUS STRAP-SHAPED MATERIALS BY MEANS OF A PLURALITY OF SIMULTANEOUS LONGITUDINAL CUTS OF A WIDE STRIP OF MATERIAL FED BY A ROLLER.

The object of this invention is a perfected machine, which, with a continuous operating cycle, makes it possible to package a plurality of rolls of various strap-shaped materials obtained by means of a plurality of longitudinal cuts of a wide strip of material fed by a roller.

Machines of the above type are noted, like the problems they present in operation, as specified below for some of them.

A first problem of the traditional machines derives from the fact that they must be stopped each time the rolls of material reach the required diameter, for discharge. The machine must also be stopped to change the cutting means or blades which make the longitudinal cut of the material, which reaches the machine in the form of a wide strip.

The replacement of the blades is a more negative drawback than the first, as it is lengthy.

Another drawback of the machines of known type is that the supporting means of the rollers, known in the specific technique as "spindle", must undergo a compound movement, in particular first a rotation then a transverse, to discharge the rolls of material and load a new plurality of cores destined to receive further strap-shaped material for the formation of another plurality of rolls.

The above problem, besides the intrinsic increase of operat ing times, involves the necessity to prepare complicated mechanisms that make it possible to carry out the above-mentioned compound movement.

A perfected machine of the above type has now been invented, and forms the object of this invention, which eliminates all problems of the traditional machines.

According to a first basic aspect of the perfected machine according to this invention, it is provided with means, described in detail later, which consent it to make a continuous processing cycle without stops.

Consequently, the operating times of the perfected machine according to the invention are much shorter than those of traditional machines, with obvious reduction of costs. According to a further notable characteristic of the perfected machine according to the invention, all its operating phases are clearly visible to the operator, who can therefore easily check that it is operating correctly.

Another advantage of the perfected machine according to the invention is that the movement of the supporting means of the terminated rolls, subsequently simply called "spindle", is reduced to a simple rotation, thus eliminating the complex movement of the spindles of traditional machines.

A further new characteristic of the perfected machine according to the invention is that discharge of the rolls and loading of the cores take place with the spindle at a stand still.

Another particularly advantageous aspect of the perfected machine according to the invention is the elimination of dead times to change the blades, as this machine is provided with at least two pluralities of cutting blades, the first of which is made immediately operative for a time corresponding to an efficient cut by the blades, while the second plurality, inoperative for the abovementioned time, is automatically carried to working condition without stopping the machine, while the first plurality of blades is simultaneously moved away from the work zone.

A further innovation of the perfected machine according to the invention is that, to supply the cores, a single loader is provided, in which the cores are fed vertically, making this machine further simplified compared to the traditional type.

The characteristics and advantages of the perfected machine of this invention will be seen more clearly from the following detailed description of an unbinding form of its construction, made referring to the attached drawings, in which:

fig. 1 is a schematic view of the entire perfected machine according to this invention;

fig. 2 is a schematic front view of the means for the formation of the rolls and their discharge;

fig. 3 is a schematic front view of one of the above means in the operative phase of prearrangement of a new plurality of cores;

fig. 4 is a partial schematic view of the above means in the operative discharge phase of the terminated rolls;

fig. 4A shows the connection between the discharge shaft of the terminated rolls and loading of the cores;

figs. 5 to 5H are schematic lateral views showing the movement of the supporting means of the rolls;

fig. 6 is a front view showing the means to synchronize the rotation speeds of the abovementioned spindles;

fig. 7 is a schematic lateral view showing the means to replace worn blades and put the new plurality of blades in operating condition;

fig. 7A shows the means for rapid replacement of the worn blades;

fig. 8 is a schematic lateral view showing the

discharge phase of a terminated roll and the start of a new one;

fig. 9 is a schematic lateral view showing the supply of cores to the spindles;

fig. 10 is a view in cross-section of a detail of the supporting means of the cores.

Referring first to fig. 1, the perfected machine according to the invention comprises, as a whole, a feed station 10 in which a roller of notable width is prepared, indicated with 12, from which, through the perfected machine according to the invention, a plurality of rolls as specified below will be obtained, starting from a series of longitudinal cuts on the strip of material fed by the abovementioned roller 12.

Downstream from the feed station 10, the machine comprises a station 14, provided with a plurality of shafts or spindles on which the rolls of material will be formed.

On one side of the reaction 14 a further station 16 is provided, in which the cores are loaded, then carried, as described below, to the station 14.

On the side opposite the previous one, the perfected machine according to the invention comprises a further station 18 in which the terminated rolls are discharged to be sent, for example, to a stocking station not shown.

Making particular reference to fig. 2, the formation station of the rolls 14, the loading station of the cores 16 and the discharge station of the terminated rolls 18 are described in detail.

The formation station of the rolls of material 14 will be first described.

This station comprises supporting means 20, subsequently called "spindle", which initially support the cores on which the strips of material obtained with a series of longitudinal cuts on the material coming from the roller 12 will gradually be wound.

In fig. 2 it is assumed that a plurality of terminated rolls 22 is already present, only some of them shown, which must be carried into the discharge station 18. The spindle 20 is supported, for this purpose, at its end by a pair of movable supporting elements or revolvers 24, provided with tailstocks to keep said spindle 20 in position.

The revolvers 24 can be revolved round their longitudinal axis so that the spindle 20 is carried, through rotation, donwards in the direction of the arrow F opposite a discharge unit indicated in the complex with 28.

The discharge unit 28 permits removal of the terminated rolls of material 22 from the spindle 20 and their temporary prearrangement on a supporting shaft 30 provided in the discharge station of the terminated rolls 18.

The discharge unit 28, a lateral view of which is shown in fig. 5, comprises a supporting bracket 31, above which are provided two uprights 32, which support a series of U-shaped sections 34, inserted in special seats of the uprights 32. Said sections 34 form, as can be seen in detail in fig. 2, a substantially comb-shaped structure designed to receive the terminated rolls 22, each of which are positioned between two adjacent sections 34. When the spindle 20 has terminated its downward rotation and all terminated rolls 22 have been placed between the sections 34, a hollow shaft 36 is longitudinally operated, in which the cores 44 of the core loading unit are positioned; this unit, through traverse in direction of the discharge unit 28 carries out removal of the rolls 22 from the spindle 20 and their temporary support on the shaft 30.

The shaft 36 is controlled by a motor 38, which, by means, for example, of a worm screw 40 controls its advances in the direction of arrow G of fig. 2. The shaft 36 thus causes a transversal transverse of the bracket 31 on its means of support 42 and therefore the transversal transverse of the uprights 32 and terminated rolls 22.

As can be seen in detail in fig. 3, the terminated rolls 22 are therefore positioned on the supporting shaft 30, freeing the spindle 20 on which a new set of cores 44 is positioned, again to drive the shaft 36. The spindle 20 is now returned to its starting position by rotation of the revolver 24 in opposite direction to the previous one. Discharge of the terminated rolls 22, with particular reference to figs. 3 and 4, takes place in the following way. The supporting shaft 30 is connected to a control motor 46, which, by means of a mechanism of worm screw type or similar, can cause it to move back by a pre-established length (fig. 4) so that the terminated rolls 22 fall one at a time into a collection station, not shown, in the direction of arrow H of fig. 4. The terminated rolls 22 are made fall at a time by returning to the initial position the comb-shaped structure provided with sections 34, which is connected to the shaft 36 by a mechanism described below with reference to fig. 4A. The connection between the shaft 36 and the upright 32 is obtained by means of a pair of small rods 33, which present, longitudinally, a slit 35 which extends for almost their entire length.

The small rods 33 are engaged at their ends with stop elements 33, respectively integral to the upright 32 and shaft 36. The stop elements therefore slide into the slits 35 and therefore, when the shaft 36 moves in the direction of arrow G of fig. 2, the opposite ends of the upright 32 and shaft 36 can approach each other, coming into contact.

When the shaft 36 moves in opposite direction to the previous one, the abovementioned opposite ends return to the position illustrated in fig. 4A,

Through this connection the shaft 36 can control a traverse of the uprights 32, thus carrying all

terminated rolls 22 to place them on the shaft 30, as shown in fig. 3.

At this point, the shaft 36 is made move back in reverse direction to that of arrow G, so that the above connection, obtained by means of the small rods 35, makes it possible to return the uprights 32 to the position indicated in fig.2, thus discharging the terminated rolls 22 at the collection station, as specified above.

Once a new set of cores 44 has been positioned on the spindle 20, the latter, through rotation of the revolver 24 in reverse direction to the previous one, is restored to its initial position.

With particular reference to fig. 5, the above operating phases are shown, in lateral view, for the movement of the spindle 20 to the discharge station 28 and its positioning for the formation of a new set of rolls of material 22.

In fig. 5, in which the same elements as the previous drawings have been indicated with the same reference numbers, we further note, associated to the revolver 24 sketched in this figure, a turret 50 carried by the casing of the machine revolvingly by a revolving shaft 52, suitably shaped on one face to receive and discharge the spindles 20. In the abovementioned figs. 5 to 5H, one end side of the turret 50 is illustrated, as, on the opposite end of the shaft 52, a corresponding, identical side will be provided. The turret 50 is provided, on one side, with two shaped essentially semicircular hollows 54, each of them suitable to receive and support one of the ends of a spindle 20.

In particular, the distance between the hollows 54 will be such that the turret 50 can simultaneously support a spindle 20 supporting the cores 44, together with a spindle 20 supporting a plurality of terminated rolls 22, as results, in particular, from an examination of figs. 5D and 5E. In fig. 5 the turret 50 is represented with continuous line in the position in which it is about to receive a spindle 20 loaded with cores 44 thanks to the movement of an operative arm 56 of which more will be said later.

In fig. 5A the turret 50 has made a clockwise rotation of approximately 90° with respect to the previous position in clockwise direction marked by arrow 0 of the same figure. The abovementioned spindle 20 loaded with cores 44 will now be suitably housed with its ends on the two turrets 50.

As can be seen from the abovementioned fig. 5A, the adjacent hollows 54 are empty for the moment, as they do not support any spindle.

Always with particular reference to fig. 5A, we note that the revolver 24 is provided with suitable means of support, essentially positioned 180° from each other, provided to support a pair of spindles 20.

Furthermore, the revolver 24 is carried revolvingly by a shaft 55.

The spindle located on the left of the revolver 24 in fig. 5A is loaded with cores 44, while the spindle 20 on the right of the same figure is also loaded with cores 44, but on them are forming the rolls 22, as it is seen that they are being reached by the strips of material 72.

The revolver 24 is now given, in any known way, an anticlockwise rotation in the direction of arrow P of fig. 5A with such a speed, referring also to figs. 5B and 5C, so that the two spindles 20 gradually occupy the position previously occupied by the other. At this point, the rotation of the revolver 24 is momentarily stopped (fig. 5C) and on the spindle 20, which is now located on the left, will be placed a plurality of terminated rolls 22, while on the spindle 20, now on the right, will start the formation of a new set of rolls 22.

As can be noted again from fig. 5C, the strips of material 72 now present a direction that is substantially tangent to the cores 44 of the spindle 20 on the right.

A cutting station 90, described in detail below, now cuts the strips 72, having predominantly or simultaneously applied a terminal strip.

At this point the machine, thanks to means of coordination not shown, discharges the terminated rolls 22, removing the relevant spindle 20 from the revolver 24.

This operative phase will now be described with reference to figs. 5C to 5H.

The turret 50 is first put in rotation so that it rotates round the shaft 52, which can slide in a suitably shaped groove 53.

In this way, simultaneously to rotation of the turret 50, it is raised upwards.

In fig. 5D it is seen that the empty hollows 54 of the turret 50 grip the spindle 20 on which are present the termi nated rolls of material 22, while simultaneously on the other spindle 20, located on the revolver 24, are forming a new set of rolls 22.

Rotation of the turret 50 continues while the spindle is maintained at a standstill until (fig. 5E) the spindle 20 loaded with the cores 44 is placed on the revolver 24. The turret 50, which suitably supports the spindle 20 loaded with rolls 22 just removed from the revolver 24, continues rotating until it reaches the position in fig. 5F.

At this point starts, as regards the revolver 24, an operative phase substantially identical to that described in figs. 5A to 5C.

In fact, it is re-rotated, always in anticlockwise direction, marked by arrow P at a speed like that specified above.

The turret, during this operative phase, is not rotated and the machine, by means of means described below, removes the spindle 20 loaded with terminated rolls 22 from the turret. Figs. 5G and 5H

illustrate, for the revolver 24, the operative completion phase of the rolls 22 and the cutting phase of the strips of material 72.

The machine according to the invention, to remove the spindle 20 loaded with rolls 22 from the turret 50, comprises an operative arm 56 which can advance both in horizontal direction backwards and forwards, as indicated by arrow L in fig. 5, and vertically upwards and downwards, as as indicated by arrow M of the same figure.

The operative arm 56 is controlled in its horizontal displacements by noted schematized means, e.g. as means with rack 58. Its vertical displacements will be controlled by noted means not shown, e.g. means with piston or similar. It is now assumed to start from the position of the operative arm 56 shown in fig. 5E, from which it is made advance up to the position in fig. 5F. The special conformation of the hollows 60 provided at the ends of the two operative arms 56 will permit the coupling and withdrawal of the spindle 20 loaded with rolls 22 by turret 50.

Said operative phase is easily understood from the examination of figure 5F (coupling of spindle 20) and fig. 5G (deposit of the spindle in discharge station 28), as it is seen that the operative arms 56 have been first made move back, and, now referring also in particular to fig. 5, they have undergone a downward traverse up to the position represented with dotted line from which they are again made move back, leaving the spindle loaded with rolls 22 in discharge station 28.

The operative phases described above for one of the spindles 20 must be considered identically valid for the other spindle 20, for which the description of the above phases is obviously omitted.

According to a further particularly advantageous aspect of the perfected machine according to the invention, means are provided to control the rotations of the spindles 20 in synchroniam with one another.

These means are shown in detail in fig. 6 and described below.

With reference to the abovementioned figure, these means comprise a first and second control motor 60 and 62, which are connected to the spindles 20 by means of return kinematisms which carry the movement of rotation of both the first control motor 60 and the second control motor 62 to the axis 64 of one of the spindles 20 whose rotations involve those of the spindles 20, in such a way that, through said kinematisms, the peripheral speeds are identical.

One of the spindles 20 will be loaded with rolls of material 22 almost terminated, while the other will be loaded with rolls 22 started.

The motors 60 and 62 can be controlled in noted way by means of a card programmer which controls the operation of both motors in order to obtain the abovementioned desired synchronism so that the peripheral speed of the spindles 20 is similar.

A detailed description will now be given of the cutting unit of the perfected machine according to the invention, which, according to an advantageous aspect, permits automatic replacement of a set of worn blades with a set of new blades without interrupting operation of the machine.

With reference to fig. 7, the material in strip 66 of notable width comes from a return roller 68 and advances, after a further return roller 70, in the direction of arrow N to be cut into strips of prefixed width which are wound on cores 22a, which, traditionally, are prefabricated in cardboard, plastic or similar.

The means which cut the strip 66 into thin strips 62 comprise a first plurality of blades 76 carried by suitably shaped means of support 78, which, at one end, are fixed on a supporting shaft 74 carried revolvingly by the casing of the machine which can rotate in the direction of the double arrow 0 in fig. 7.

The abovementioned first set of blades 76 is in the operative position in which the blades cut the wide strip 66 into thin strips 72, and, in particular, it is noted that cutting takes place on one side of the wide strip 66, which can be defined as external side with respect to same.

As mentioned above, the perfected machine according to the invention has made it possible to eliminate dead times for replacement of the cutting means, as, as noted in particular in fig. 7, it presents a second plurality of blades 82 carried by means of support 80, which are destined to operatively replace the blades 76 of the first set when the latter are worn.

The blades 82 of the second set, now in inactive position, are placed on a second shaft 81 which can be made rotate in the direction of double arrow R of fig. 7.

The second shaft 81 is staggered with respect to the first shaft 74 and essentially parallel to it.

Furthermore, the second shaft 81 is placed, with respect to the thin strips 72, on the side opposite what may be defined as internal side with respect to same.

Making particular reference to fig. 7A, the means are described which consent rapid replacement of the blades when they are worn.

The above means are identical for each set of blades and comprise a small piston 83 whose shank is movable inside a hollow 89 of the means of support 78 and 80, said shank being provided with a projection 85, engaged in a hollow 87 of the means of support 78 and 80.

The width of the hollow 87 is greater than that

of the projection 85. In this way, when the blades, e.g. blades 82, are in operative cutting position, the shank 83 is made re-enter in the small piston so that the projection 85 is engaged in a face of the hollow 87 locking the supports 80. When the blades must be changed, as is now the case of the blades 76, a limited emission of the shank 83 is controlled in noted way so that the abovementioned projection 85 is released from the supporting elements 78, which may be easily and quickly removed.

A new set of blades is then applied to support 78.

Referring to figs. 7 and 7A, it is noted that cutting of the wide strip 66 takes place on its external side (fig.7) or internal side (7A).

These two forms of construction, which may be used alternatively, are chosen according to the material to be cut. It should also be noted that, in the form of construction shown in fig. 7, means to release supporting elements 78 and 80 are not provided as these elements are supported in any noted way by a cross-piece supported at the end by two supporting arms 80a and 78a.

It will be sufficient to remove the cross-piece supporting the worn blades and replace said blades with a set of new ones.

Naturally, also in the case of the form of construction in fig. 7A, the supporting means of the blades will be supported by a corresponding cross-piece and the procedure will be similar, operating the small pistons 83 later when the cross-piece has been removed from the machine.

From the above description it is evident that there is a considerable advantage in being able to replace a cutting unit 76 with another 82 without having to stop the machine. With particular reference to fig. 8, the part of the perfected machine according to the invention is described, which ejects a terminated roll of material 22 and starts a new roll on a core 44.

The strip of material of notable width 66 also comes in this case from a return roller 68 and it, being in double layer, is directed to the abovementioned return roller 70 shown in fig. 7 and to another return 85, so that the strip 66 is sent to the upper spindle 20 in the direction of arrow N and to the lower spindle 20 in the direction of arrow T.

Longitudinal cutting of the wide strip 66 takes place as described above, and, in fig. 8, is shown and described below, the way with which the formation of a new roll of material 22 starts on a core 44.

This part of the machine comprises an operative piston not illustrated, provided for the movement in the direction of double arrow S of fig. 8 of an arm 86, hinged in 88, and a unit for the formation of a new roll of material indicated in the complex with 90.

The unit 90 comprises a support 92 whose rotation is controlled by the arm 86, as the abovementioned support 92 is hinged in 94 to the casing of the machine.

The support 92 is shown with broken line in the inactive position and with continuous line in the work position. Once the arm 86 is driven to make an upward traverse, the support 92 will correspondingly be brought to the lowered position in which it is represented with continuous line. On the support 92 is placed a further operative arm 96, hinged in 98 to support 92, which is provided, at one end, with cutting elements 100 to operate on the cores 44 for the start of a new roll of material and for the transversal cutting of the thin strip of material 72 so that it is fixed on the core 44.

The second operative arm 96 is provided with means 102, which, pressing the end of the thin strip 72 on the core 44, stretch the latter, causing its peripheral adhesion on core 44 after application with known means, not shown, of a strip. When the thin strip 72 has continued its forward movement, thanks also to the rotation of core 44, its end is engaged in cutting element 100 of the operative arm 96, which therefore cuts said end so that the thin strip 72 can be wound on core 44.

Making particular reference to fig. 9, the feed station of the cores 22a to the machine is described.

According to a characteristic of this invention, the cores 44 are visible outside the machine as in this latter there are no mechanisms in movement in front of the feed station of the cores as in traditional machines.

The feed station of the cores 44 comprises a feed hopper 104 provided in noted way with a device which makes it possible to arrange the cores 44 in order even if they are inserted haphazardly in the hopper 104.

The cores 44 descend, from the hopper 104, into a feed duct 106 by gravity and are superimposed one on the other to be able to be sent one at at time to the station in which the shaft 36 on which they must be loaded is positioned.

The means which feed the cores 44, one at a time, to the packaging station of each of the spindles 20, comprise means to temporarily stop one core 44 at a time and permit its feed to the station in which the shaft 36 is placed. The above means, which may be connected to a card programmer or similar for sequential operation, comprise deenergizable stops placed on two planes, each corresponding to one of the spindles 20.

Fig. 9 shows a detailed shematic view of the unit that permits the feed of one support of the cores, as the other will be identical.

The unit to feed the cores one at a time

comprises first of all a first de-energizable stop 108 composed of an arm against which a core 44 stops, withheld, on the opposite side, by the side wall of the feed duct 106.

The stop 108 is hinged on a small shaft 110, which can be rotated in clockwise direction according to the direction of arrow U so that it permits the fall of core 44 on a further stop 112, also composed of an arm hinged in 114 on its own small control shaft, connected, like the small shaft 110, to means not shown and programmable. The stop arm 112 is longer than the stop arm 108 as it has a different, supplementary function.

The arm 112 can, in fact, permit the feed of core 44 and a duct 116 carrying the cores 44 to the relevant loading station, or, alternatively, rotated in the direction of arrow U in fig. 9, permits the further descent of core 44 into a further feed duct 118 to carry the cores 44 towards the other loading unit of the cores.

As can be noted in particular in fig. 9, the cores 44 are perfectly aligned in both the ducts 116 which carry them to the loading station 36, and in the vertical ducts 118 fed by hopper 104.

Each of the feed ducts of cores 44 to the loading station comprises, along its route, a plurality of de-energizable stops 120, consisting, like stops 108 and 112, of stop arms each hinged on its small control shafts 122 connected to the same programmable means which control operation of the small shafts 110 and 114.

Once the cores 44 are fed to ducts 116, the stop arms 120 withhold the latter in the position shown in fig. 9. In the form of construction shown, the perfected machine according to the invention withholds one pair of cores 44 at a time as there are two stop arms 120.

The abovementioned programmable means first free the core 44 placed in the front by means of anticlockwise rotation of the arm 120 associated to it, and, once this arm is returned to stop position, an anticlockwise rotation of the arm 120 will be commanded so that another core 44 goes to the exit end of feed duct 116.

The operating cycle of the perfected machine according to the invention can alternatively provide complete feed of the upper duct 116 with consequent filling of the loading station of the cores, associated to upper spindle 20, and, subsequently, complete feed of the loading station of the cores associated to lower spindle 20, or feed of one core 44 at a time for the loading station of the upper and lower cores.

In both the above alternatives, loading of the cores 44 to the machine will be fast and reliable.

A description will now be given, with particular reference to fig. 10 but taking into account also fig. 9, of the loading station of the cores 44, which are fed, as described above, by the feed station of the cores described with reference to fig. 9.

The discharge and collection station of the cores 44 receives them by means of any known means, e.g. an inclined plane 126 shown with broken line in fig. 9. This station, formed by shaft 36, is now described in detail.

The shaft 36 is in two parts or jaws which made be made integral to one another, which, to receive cores 44 are initially open.

The collection station of cores 44 will therefore subsequently be indicated as shaft or station 36.

The position described above of the shaft 36 is shown in fig. 9, in which the station 36 presents a first jaw 128 integral to supporting means 130 and a second jaw 132 hinged in 134 to an upright integral to supporting means 130.

Both jaws 128 and 132 present an essentially semicircular form, so that, when they are coupled to one another and made integral, they enclose cores 44 in their suitable seats, as shown in fig. 10.

With reference to the above figure, sensor means 136 are provided in discharge station 36 to detect the presence of the single cores 44 in the above station and their correct positioning in same.

The abovementioned sensor means may consist of an electric switch comprising a plate 138 which is stressed upwards by a pin 140 pushed in the direction now considered by the core 44. The sensor means 136 will be connected in known way to luminous, acoustic or similar means to confirm correct positioning of cores 44.

From the above description, the advantages are evident of the use of the perfected machine according to the invention which, thanks to its special conformation, can offer a continuous operation with automatic cycle, thus eliminating the dead times of traditional machines.

Finally, it is clear that variants and/or modifications may be made to the perfected machine according to this invention, without affecting its protection.

Claims

1) Perfected machine with continuous operating cycle for the packaging in rolls of various strap-shaped materials starting from longitudinal cutting of same along a strip of notable length, comirising a feed station of said strip, a cutting station of said strip into thin strips of predetermined width, and a core loading station suitable to receive for winding said thin strips for the formation of rolls, comprising finally a discharge station of the terminated rolls, characterized by the fact that the formation station of the terminated rolls (22) comprises at least one spindle (20), on which said rolls in formation are

placed, supported by means (24) suitable to control a movement of rotation towards a discharge station of same (28), provided with a series of supports (34) suitable to receive, between each of them, a terminated roll (22), said discharge station (28) being movable towards a temporary supporting shaft (30) on which the series of terminated rolls (22) is destined to remain, while, simultaneously, is energized a feed station (16) of a further set of cores (44) destined to receive the strips of material, which places said cores (44) on the spindle (20), which, once the feed station of said supports has returned to starting position, is returned to the initial position.

2) Perfected machine according to claim 1, characterized by the fact that the discharge station (28) of the terminated rolls (22) comprises, on a supporting bracket (31), a series of sections (34) substantially of U shape, suitable to receive, between a section (34) and the adjacent one, a terminated roll (22).

3) Perfected machine according to claim 2, characterized by the fact that the bracket (31), supporting the sections (34) housing the spindle (20), is transversally displaceable by an arm (36) of the feed station of the cores (44).

4) Perfected machine according to claim 3, characterized by the fact that the arm (36) provided for transversal displacement of the bracket (31) supporting the spindle (20) is a hollow shaft suitable to receive internally the cores (44), while simultaneously, during the transversal movement given to it, it is suitable to control the position of the terminated rolls (22) on the shaft (30).

5) Perfected machine according to claim 4, characterized by the fact that the hollow shaft (36) is connected to control means of its feed, e.g. a worm screw or similar (40).

6) Perfected machine according to claim 5, characterized by the fact that the worm screw (40) is controlled by a motor (38) provided with means to reverse its direction of rotation.

7) Perfected machine according to claim 1, characterized by the fact that the shaft (30) temporarily supporting the terminated rolls (22) is connected to control means (46) to cause its backward movement with respect to the spindle (20) on which the cores (44) have been positioned, permitting the fall of the terminated rolls (22) towards a collection station.

8) Perfected machine according to claim 7, characterized by the fact that the hollow shaft (36) and uprights (32) supporting the terminated rolls (22) are connected to each other by at least one pair of cross-bars (33) provided with a longitudinal slit (35) in which are inserted in sliding manner pins (39), respectively integral to the shafts (36) and uprights (32).

9) Perfected machine according to claim 1, characterized by the fact that to the supporting means (24) of the spindles (20) is associated at least one turret (50) carried revolvingly by a shaft (52) of the casting of the machine, which is also smooth-running in a shaped groove (53) prepared to carry said turret (50) to the seats of the supporting mzans (24) of the spindles (20).

10) Perfected machine according to claim 9, characterized by the fact that the movement of the turret (50) consists of a rotation associated with a traverse in direction of the supporting means (24) of the spindles (20).

11) Perfected machine according to claim 10, characterized by the fact that the turret (50) consists of at least one pair of shaped plates, each provided with at least one pair of hollows (54) to receive and withhold the ends of the spindle (20).

12) Perfected machine according to claim (11), characterized by the fact that the movement of rotation and simultaneous traverse of the turret (50) is such that it carries at least one of the hollows (54) to suitable supports of the spindle (20) of the means of support (24) of the latter.

13) Perfected machine according to claim 10, characterized by the fact of comprising, associated to each turret (50), an operative arm (56) for each end of said turret, driven by control means designed to carry a spindle (20) loaded with cores (44) on said turret (50) and withdraw from same a spindle (20) loaded with terminated rolls (22).

14) Perfected machine according to claim 13, characterized by the fact that the operative arm (56) is controlled by means designed to give it a bidirectional traverse with respect to the turret (50) and a vertical movement, also bidirectional, with respect to said turret (50).

15) Perfected machine according to claim 14, characterized by the fact that the operative arm (56) is provided with seats (60) suitably shaped at its end to receive the ends of the spindle (20) automatically.

16) Perfected machine according to claim 1, characterized by the fact of comprising transmission kinematisms to synchronize the rotating speed of the spindles (20) with which the machine is equipped.

17) Perfected machine according to claim 1, characterized by the fact of comprising a first set of cutting elements (82) of the wide strip (66) of material and a second set of cutting elements (76) of the abovementioned strip to be carried alternatively to work position when one of the above sets is worn.

18) Perfected machine according to claim 17, characterized by the ract that the cutting elements (82) of the first set and the cutting elements (76) of the second set are carried by supporting means

(80) and respectively (78) supported by means of support (80a), respectively (78a), connected to revolving shafts (81), respectively (74).

19) Perfected machine according to claim 18, characterized by the fact that the shafts supporting the means of support of the cutting elements (82), (76) are essentially parallel to each other and disaxised.

20) Perfected machine according to claim 18, characterized by the fact that the cutting elements (82) and (76) of the wide strip (66) of material can cut same on one side or the other.

21) Perfected machine according to claim 18, characterized by the fact that the means of support (80) and (78) of the cutting elements (82) and (76) of the wide strip (66) are supported by a crosspiece removable from means of support of the machine.

22) Perfected machine according to claim 20, characterized by the fact that the means of support (80) and (78) of the cutting elements (82) and (76) are locked by piston means (83), engaged with said means of support (80) and (78) with a projection (85) freeable from said means of support (80) and (78).

23) Perfected machine according to claim 1, characterized by the fact of comprising a cutting unit (90) to interrupt the feeder at at least one roll of material terminated (22) and apply a terminal strip.

24) Perfected machine according to claim 1, characterized by the fact of comprising a feed station of the cores (44) provided with at least one essentially vertical duct (118) from which a series of ducts (116) depart to carry the cores (44) to the various collection stations (36).

25) Perfected machine according to claim 24, characterized by the fact of comprising, on both the feed ducts (118) and the ducts (116) stop arms (120), which can be de-energized, to feed one core at a time to the collection station (36).

26) Perfected machine according to claim 25, characterized by the fact that the arms (120) are adjustable and programmable by means of automatic control.

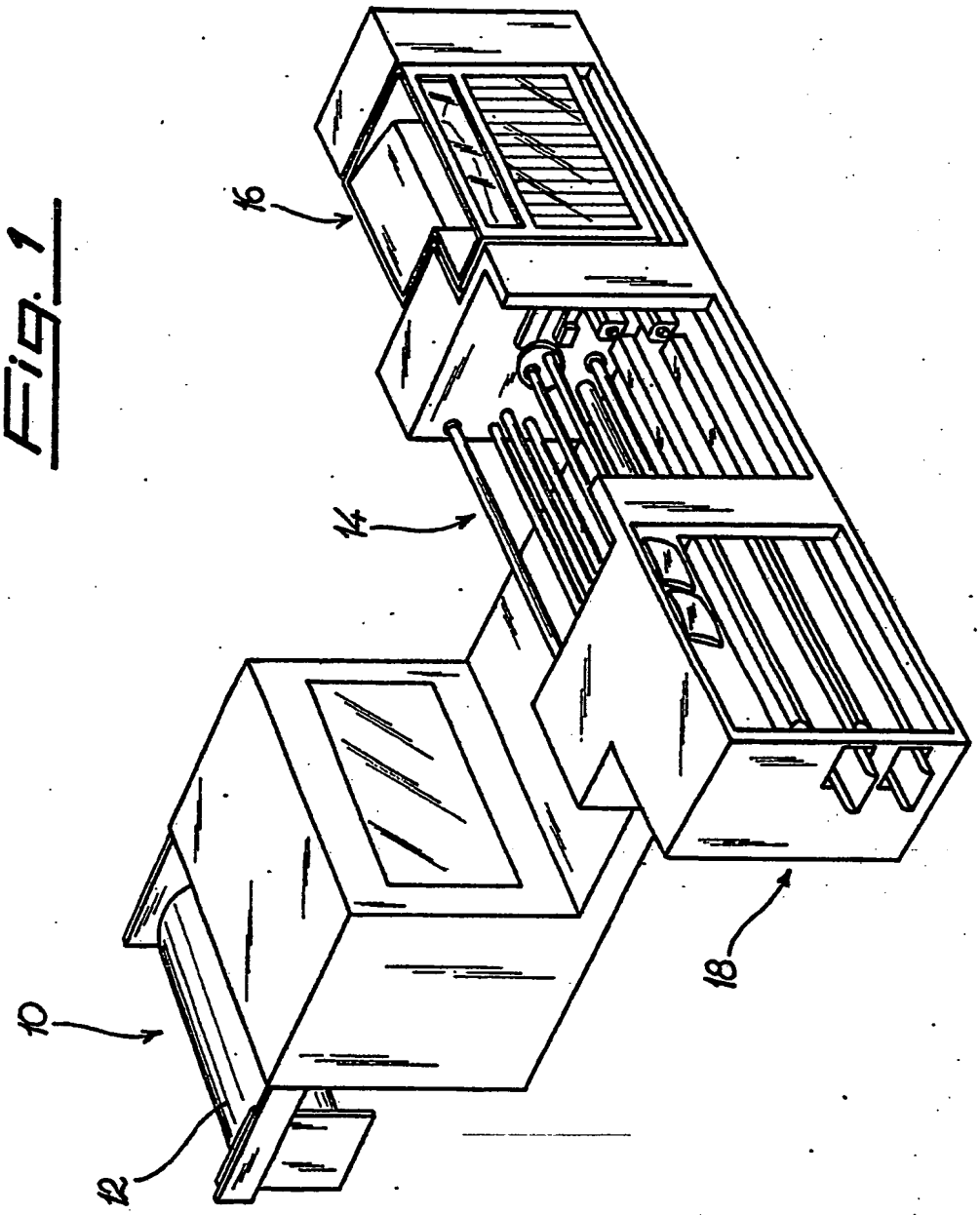
27) Perfected machine according to claim 25, characterized by the fact that the collection station of the cores (44) consists of the hollow shaft (36) which is shaped in two separable portions (128) and (132) to receive and withhold the cores (44).

28) Perfected machine according to claim 27, characterized by the fact that to one of the portions (132) of the shaft (36) are associated sensors (140) to detect the presence of a core (44) and send a signal to detectors.

29) Perfected machine according to the previous claims, characterized by the fact of comprising programmers for coordinated operation of the controls of the machine parts.

30) Perfected machine with continuous operating cycle for the packaging in rolls of various strap-shaped materials by means of a series of simultaneous longitudinal cuts of a wide strip of material fed by a roller, substantially as described above and shown in the attached drawings.

Fig. 1



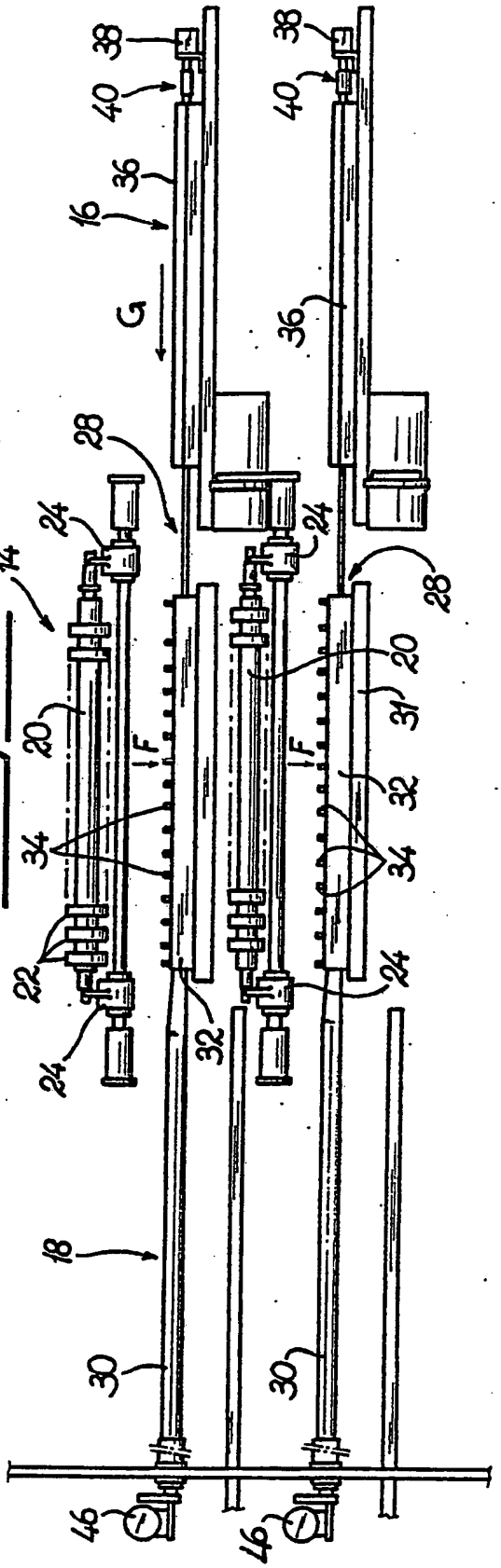


Fig. 2

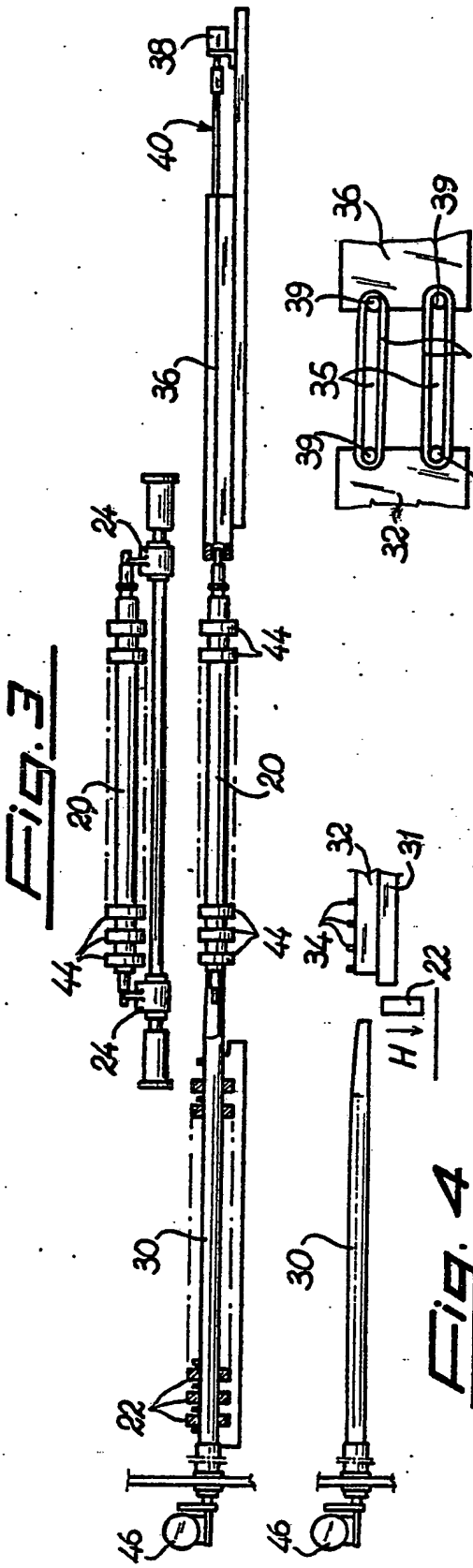


Fig. 3

Fig. 4A

Fig. 4

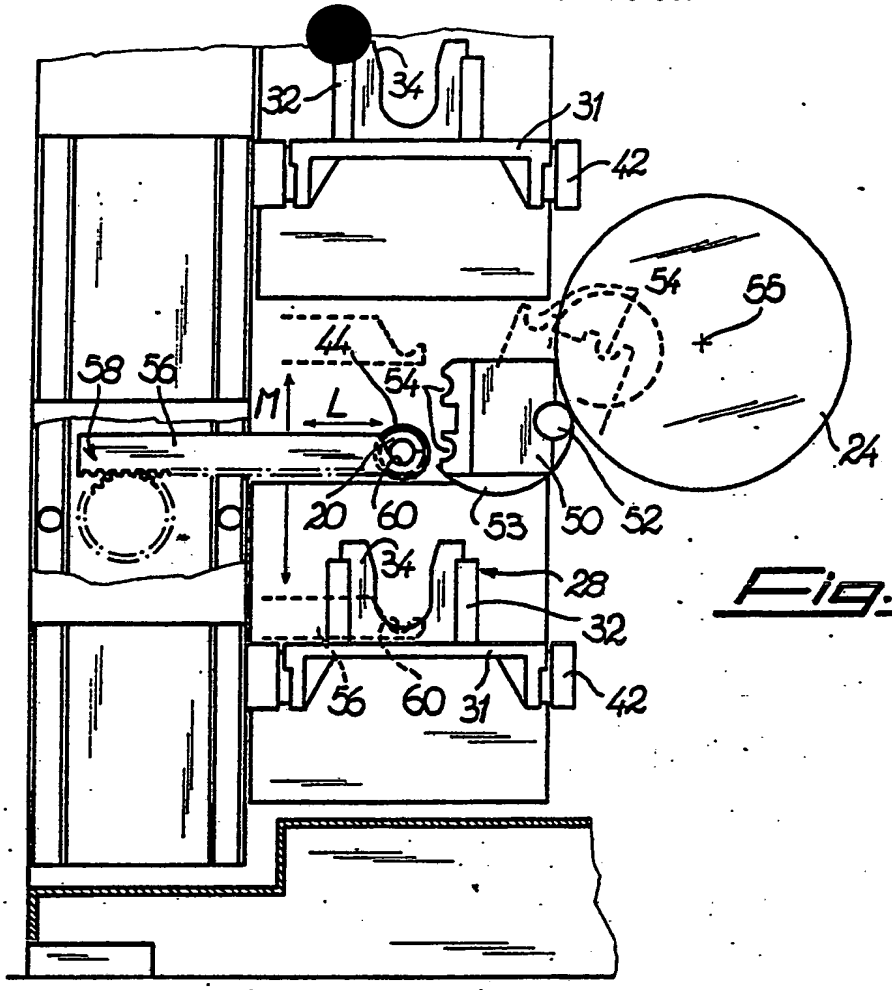

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Fig. 5

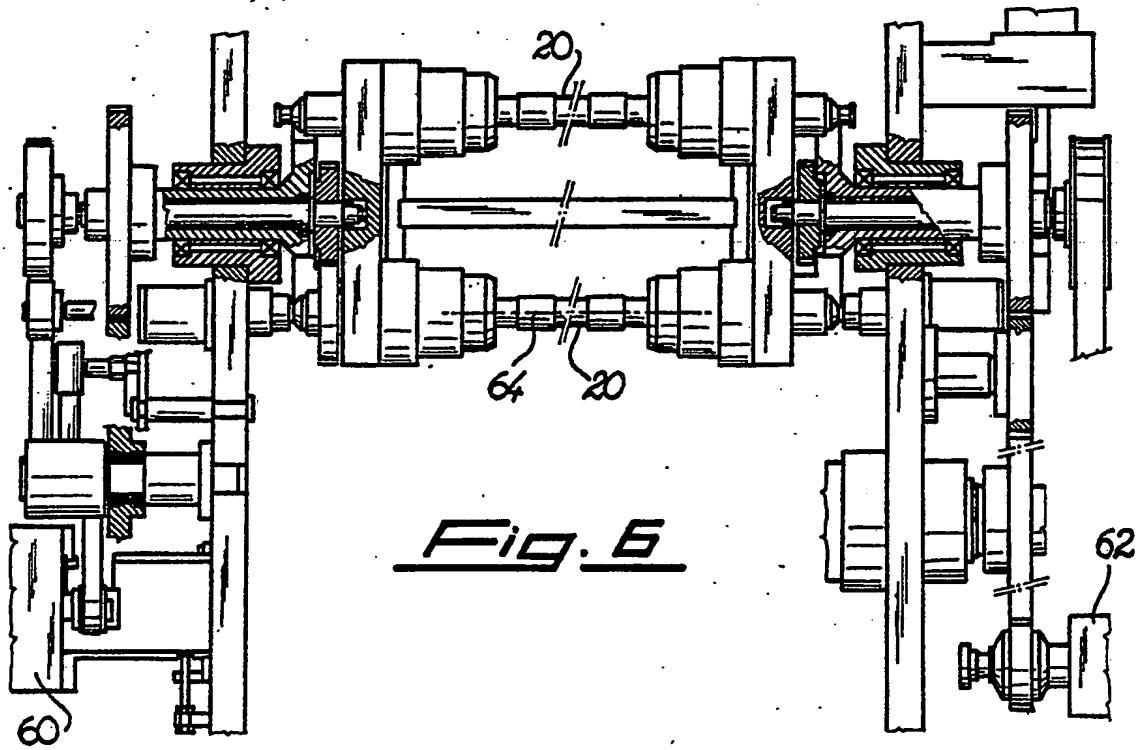
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Fig. 6

Fig. 5A

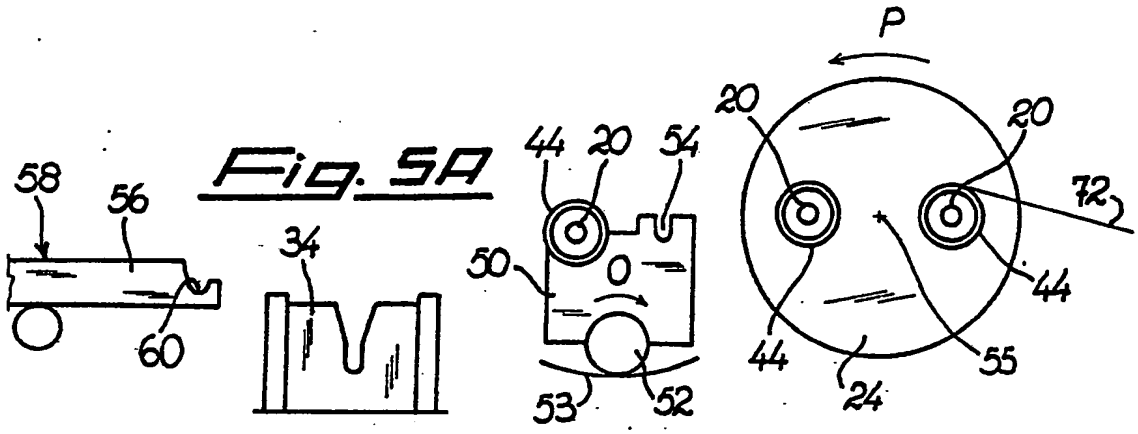


Fig. 5B

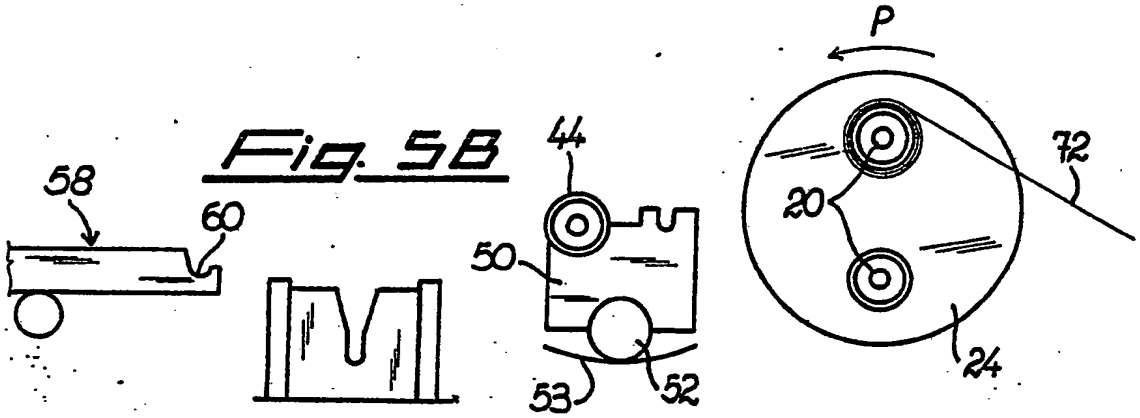


Fig. 5C

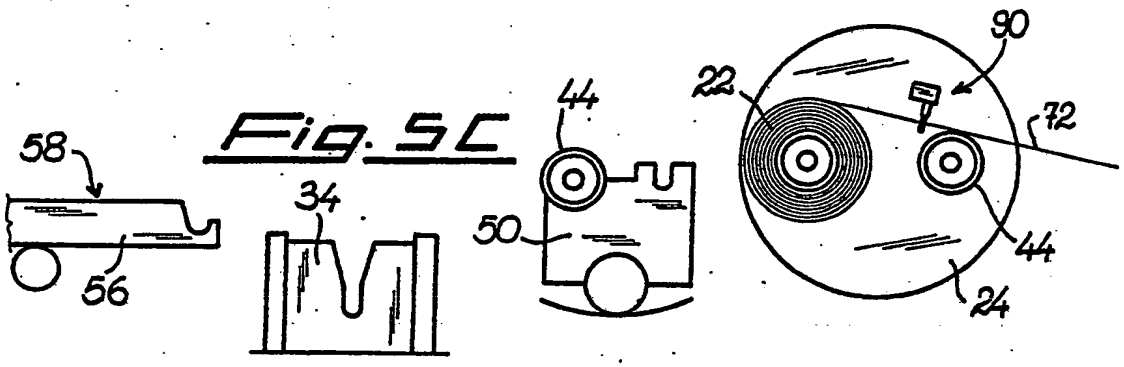


Fig. 5D

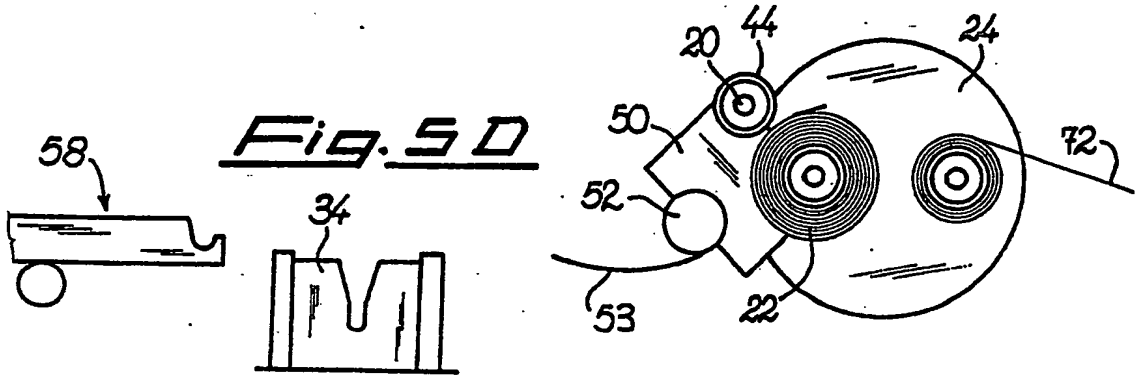
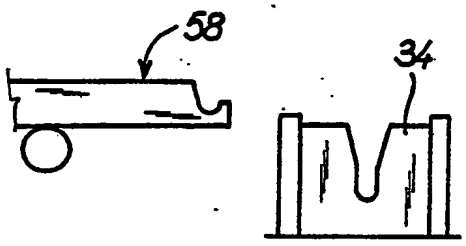


Fig. 5E



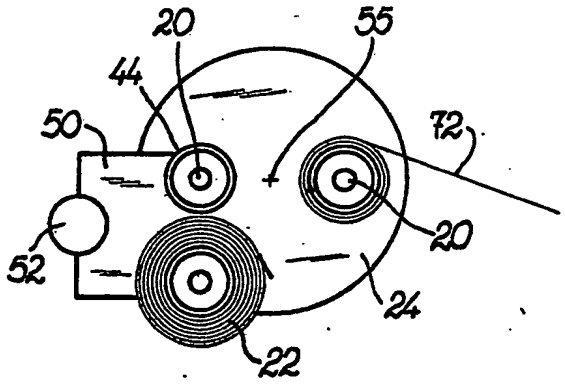


Fig. 5F

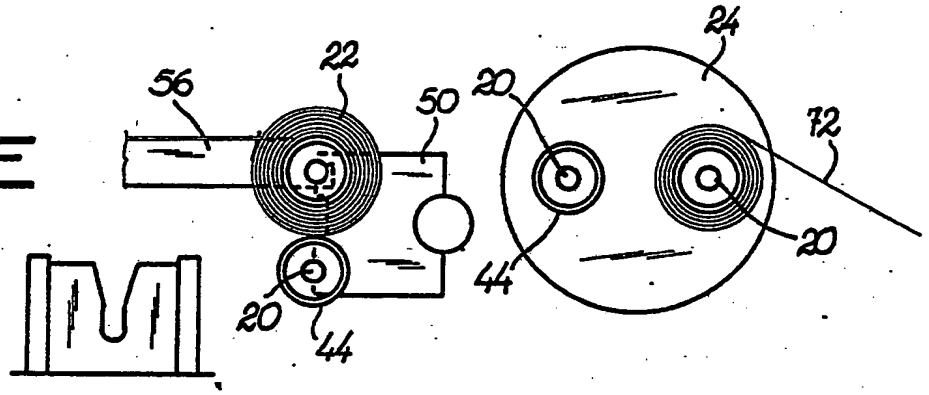
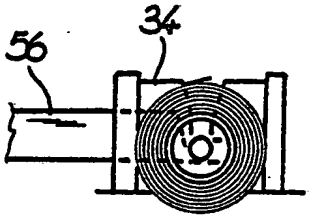
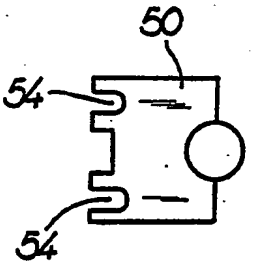


Fig. 5G





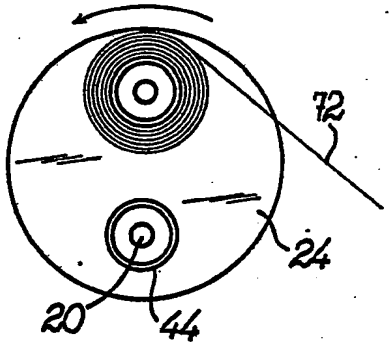
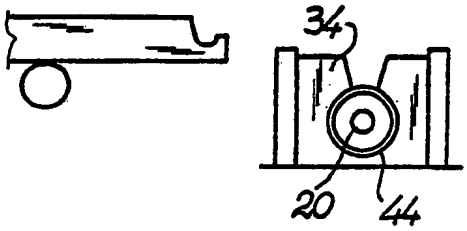
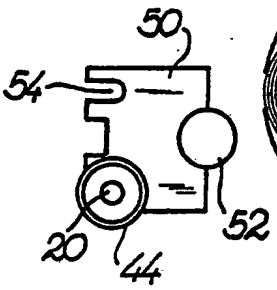
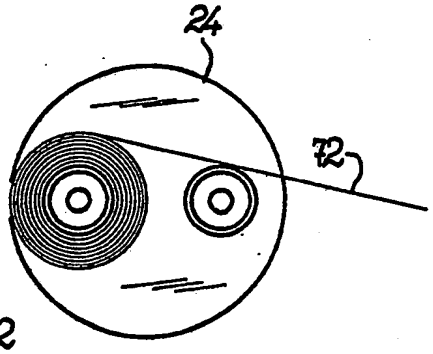


Fig. 5H







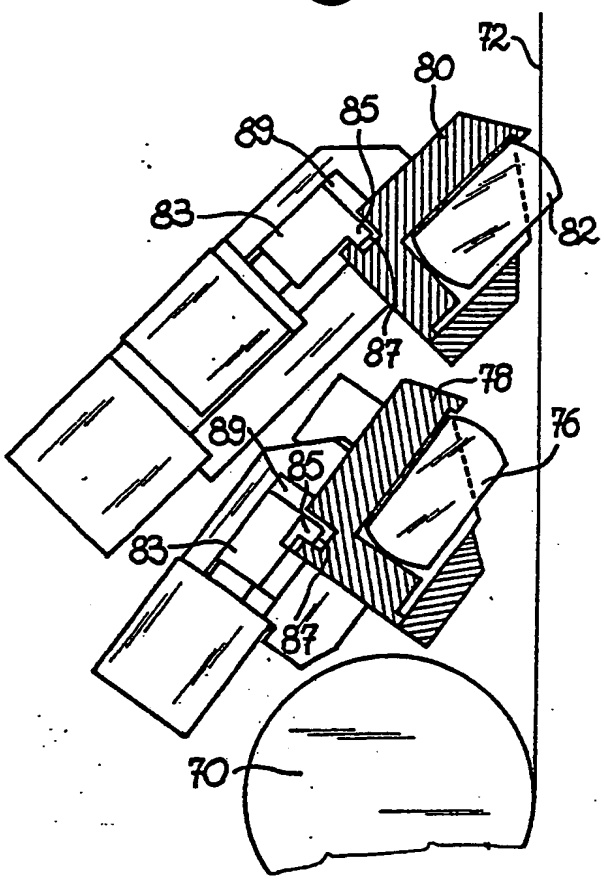


Fig. 7A

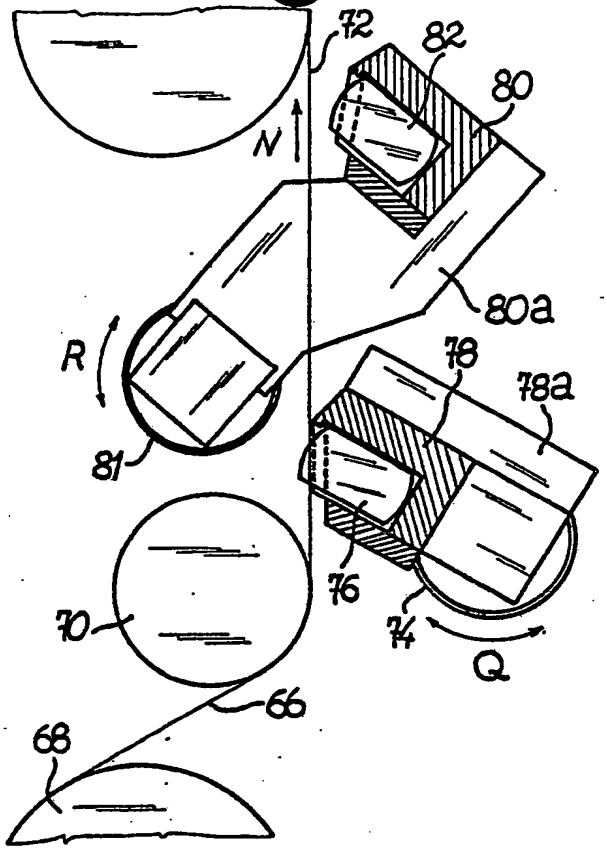


Fig. 7

Fig. 8

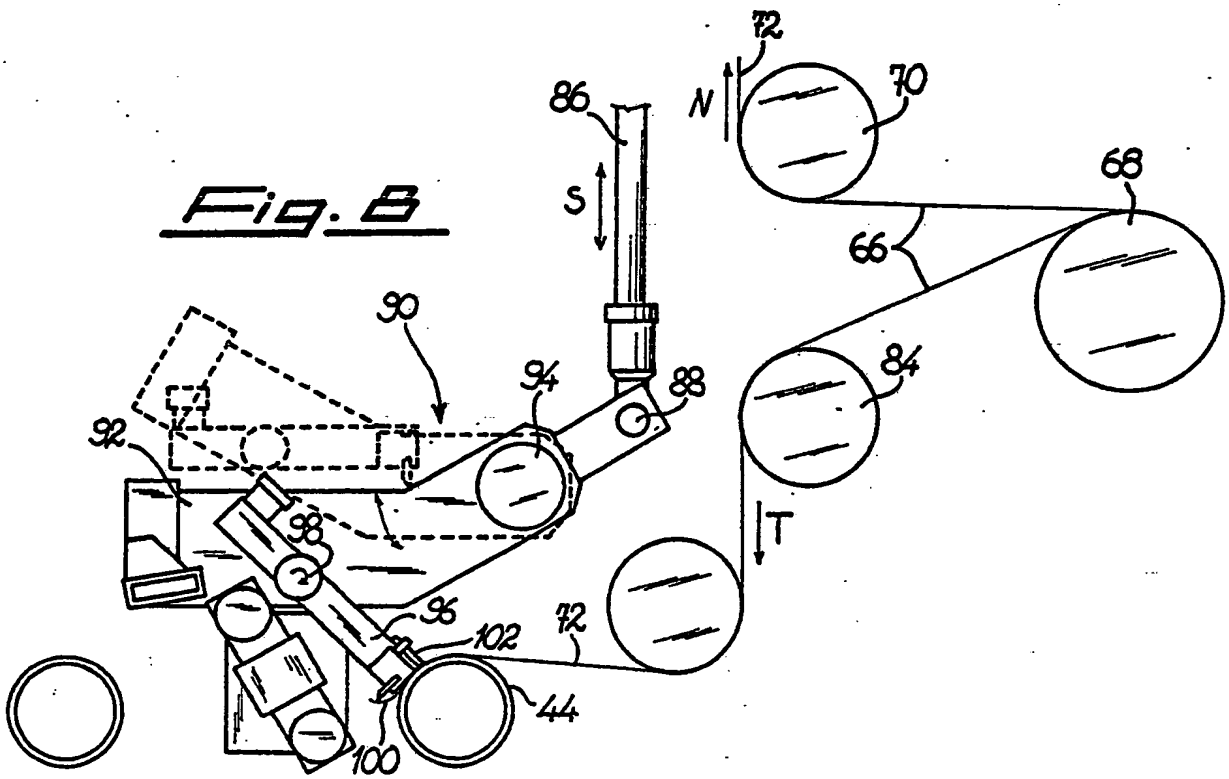
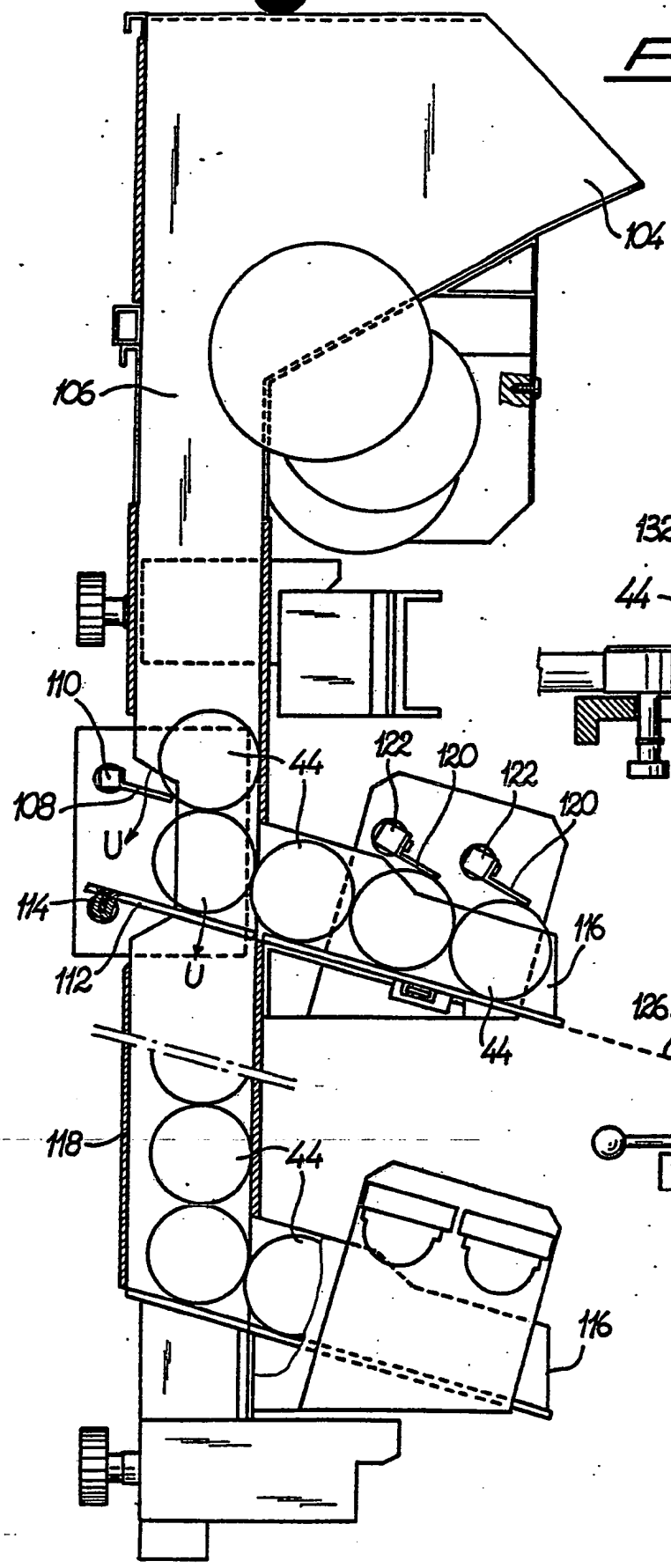


Fig. 9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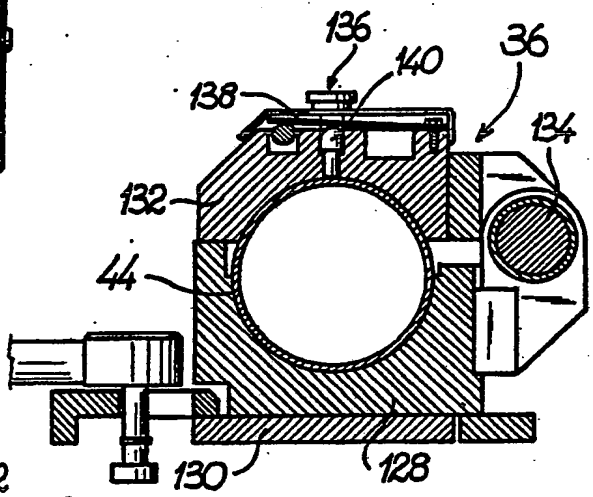
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Fig. 10

European Patent Office

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ All claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for all claims.

☐ Only part of the claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid.

namely claims:

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

X LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirement of unity of invention and relates to several inventions or groups of inventions.

namely:

1. Claims 1-8,16,23-29:
   Machine with continuous operating cylce for the packaging in rolls comprising means suitable to discharge terminated rolls from a spindle and simulteneously to load new cores on it

2. Claims 9-15:
   Machine with continuous operating cycle for the packaging in rolls comprising means to transfer spindles loaded with cores and spindles loaded with terminated rolls betweem a winding station and a discharge station

3. Claims 17-22:
   Machine with continuous operating cycle for the packaging in rolls comprising two pluralities of cutting blades

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid.

namely claims:

☒ None of the further search fees has been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims.

namely claims: 1-8,16,23-29

European Patent Office

EUROPEAN SEARCH REPORT

Application number

EP 88 83 0390

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
Y	WO-A-87 06 919 (MECCANICA COMASCA S.R.L.) * Page 6, line 17 - page 8, line 19; page 13, line 12 - page 18, line 4; figures 1a,2a *	1-7,23-25,27,28	B 65 H 19/30 B 65 H 35/02
A		16,26,29	
Y	FR-A-2 303 747 (SOC. NOVACEL) * Page 5, line 4 - page 9, line 7; figures 6-13 *	1-7,23-25,27,28	
A		8	
Y	DE-A-2 427 095 (GERHART) * Page 9, line 1 - page 10, line 21; figures 3,4 *	5,6	TECHNICAL FIELDS SEARCHED (Int. Cl.4)
Y	FR-A-2 099 363 (KALLE AG) * Page 7, line 14 - page 8, line 5; figure 7 *	7	B 65 H
A	GB-A-2 028 772 (J. DUSENBERY CO.) * Whole document *	1-8,16,23-29	

[illegible]

Place of search	Date of completion of the search	Examiner
THE HAGUE	29-05-1989	KOCH

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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